SYMSAC '76

August 10 - 12, 1976
IBM Thomas J. Watson Research Center
Yorktown Heights, New York

1976 ACM Symposium on Symbolic and Algebraic Computation

PROGRAM

TUESDAY, AUGUST 10

9:00 - 10:50

Welcoming Remarks
R. E. Gomory, Vice President and Director of Research, IBM

Session 1: Computational Group Theory I
Chairman: J. H. Griesmer, IBM Research

On Determining the Order of a Group (Invited Paper)
J. J. Cannon, University of Sydney, and ETH, Zurich

Calculating Presentations for Certain Kinds of Quotient Groups
M. F. Newman, Australian National University

Collection
G. Havas and T. Nicolson, Australian National University

10:50 - 11:10 Coffee

11:10 - 12:40

Session 2: Algorithms I
Chairman: J. Moses, MIT

Polynomial Real Root Isolation by Differentiation (Invited Paper)
G. E. Collins, University of Wisconsin
R. Loos, Universität Kaiserslautern

On Square-Free Decomposition Algorithms
D. Y. Y. Yun, IBM Research

Algorithms for Gaussian Integer Arithmetic
B. F. Caviness, IIT, and G. E. Collins, University of Wisconsin

12:40 - 1:40 Lunch

1:40 - 3:40

Session 3: System Design and Implementation
Chairman: S. R. Petrick, IBM Research

A New Reduce Model for Algebraic Simplification
A. C. Hearn, University of Utah

The Definition and Use of Data Structures in Reduce
M. Griss, University of Utah

A Pattern Compiler
R. D. Jenks, IBM Research

A Draft Description of the Group Theory Language Cayley
J. J. Cannon, University of Sydney, and ETH, Zurich

Recursive Programming through Table Look-up
D. Friedman, D. Wise, and M. Wand, Indiana University

Symbolic Evaluation of Programs--A Look at Loop Analysis
T. E. Cheatham and J. A. Townley, Harvard University

3:40 - 4:00 Coffee

4:00 - 5:40

Session 4: Applications I
Chairwoman: J. E. Sammet, IBM Federal Systems Division

Qualitative Analysis of Mathematical Expressions Using Computer Symbolic Mathematics
D. Stoutemyer, University of Hawaii

The Efficient Calculation of Symbolic Determinants
J. Smit, Technische Hogeschool Twente

Automatic Symbolic Solution of Differential Equations of First Order and First Degree
P. Schmidt, Universität Bonn

Projective Representations for Energy Band Calculations
R. Head, University of Arkansas

Perturbation Calculations for the Spin Up Problem Using Reduce
I. Cohen and F. Bark, University of Stockholm

7:30 p.m Symposium Banquet

Banquet Speaker: W. Kahan, University of California, Berkeley
Why Do We Need a Shirtpocket Symbolic Calculator

WEDNESDAY, AUGUST 11

9:00 - 10:30

Session 5: Polynomial Multiplication
Chairman: B. F. Caviness, IIT

Practical Fast Polynomial Multiplication (Invited Paper)
R. T. Moenck, University of ~~Waterloo~~ TORONTO

Arithmetic Complexity of Unordered Sparse Polynomials
F. Gustavson and D. Y. Y. Yun, IBM Research

Hashing Lemmas on Time Complexities with Applications to Formula Manipulation
E. Goto and Y. Kanada, University of Tokyo

10:30 - 10:50 Coffee

10:50 - 12:30

Session 6: Computational Group Theory II
Chairman: C. C. Sims, Rutgers University

A Machine Independent Implementation of a Collection Algorithm for the Multiplication of Group Elements
V. Felsch, Rhein.-West. Techn. Hochschule Aachen

The Schreier Algorithm for Matrix Groups
G. Butler, University of Sydney

CAMAC
V. Pless, University of Illinois at Chicago Circle

A Program for Determining Fundamental Units
M. Pohst, Universität zu Köln

On the Use of Computer Programs for the Investigation of Kronecker Classes
R. Land, Universität zu Köln

12:30 - 1:20 Lunch

MACSYMA users group 28-110

1:20 - 3:00

Session 7: Symbolic Systems and Facilities
Chairwoman: J. A. Howell, Los Alamos Scientific Laboratory

Design Features of COBALG
J. Fitch, P. Herbert, A. Norman, Cambridge University

Basic Algorithms in FORMAC: Design and Verification
K. Bahr, GMD/IFV, Darmstadt

Univariate Power Series Expansions in Algebraic Manipulation
R. Zippel, MIT

The MACSYMA "Big-Floating-Point" Arithmetic System
R. Fateman, University of California, Berkeley

Interval Arithmetic Applied to Polynomial Remainder Sequences
J. Pinkert, University of Tennessee

3:00 - 3:20 Coffee

3:20 - 5:00

Session 8: Algorithms and Foundations
Chairman: J. Hanson, Cleveland State University

Algebraic Factoring and Rational Function Integration
B. Trager, MIT

Some Problems about Polynomials
M. Mignotte, Université de Strasbourg

Using Basis Computation to Determine Pseudo-Multiplicative Independence
H. I. Epstein, Boston College

On the Sign of a Real Algebraic Number
S. Rump, Universität Kaiserslautern

Algorithms for Symmetric Polynomials
E. Lauer, Universität Kaiserslautern

8:00 p.m. - 10:30 p.m.

Panel Discussion: Future Directions in Symbolic Systems

R. D. Jenks, IBM Research, Moderator
J. J. Cannon, University of Sydney, and ETH, Zurich
W. M. Gentleman, University of Waterloo
A. C. Hearn, University of Utah
R. Loos, Universität Kaiserslautern
J. Moses, MIT

THURSDAY, AUGUST 12

9:00 - 10:50

Session 9: Algorithms II
Chairman: Carl Engelman, MITRE Corporation

Algebraic Algorithms using p-adic Constructions (Invited Paper)
D. Y. Y. Yun, IBM Research

Newton's Method: A Great Algebraic Algorithm
J. Lipson, University of Toronto

On the Subresultant PRS Algorithm
W. S. Brown, Bell Laboratories

Polynomial Real Root Isolation Using Descarte's Rule of Signs
G. E. Collins and A. G. Akritas, University of Wisconsin

10:50 - 11:10 Coffee

11:10 - 12:50

Session 10: Computational Group and Number Theory
Chairman: H. F. Trotter, Princeton University

The Aliquot Project: An Application of Job Chaining in Number Theoretic Computing
M. C. Wunderlich, Northern Illinois University

Generalization of Manin's Conditional Algorithms
H. Zimmer, Universität des Saarlandes

Computers in the Study of Lie Algebras
B. Kolman, Drexel University, and R. Beck, Villanova University

Computational Techniques and the Structure of Groups in a Certain Class
C. M. Campbell, University of St. Andrews

The Computation and Application of Vector Congruence Classes
Z. L. Lichtman, Tel-Aviv University

12:50 - 1:40 Lunch

1:40 - 3:20

Session 11: Algorithms III
Chairman: A. Miola, IAC, Rome

Simplification of Radical Expressions
B. F. Caviness, IIT
R. Fateman, University of California, Berkeley

Canonical Representatives for Residue Classes for a Polynomial Ideal
M. Lauer, Universität Kaiserslautern

Taking Advantage of Zero Entries in the Exact Inverse of Sparse Matrices
P. Wang and T. Minamikawa, MIT

Completing the nth Power of Polynomials
B. Trager, MIT, and D. Y. Y. Yun, IBM Research

A Polynomial Decomposition Algorithm
D. A. Barton and R. Zippel, MIT

3:20 - 3:40 Coffee

3:40 - 5:20

Session 12: Applications II
Chairman: G. E. Collins, University of Wisconsin

ASHMEDAI and a Large Algebraic Problem
M. J. Levine, Carnegie-Mellon University
R. Roskies, University of Pittsburgh

An Approach to Automatic Asymptotic Expansions
R. Fateman, University of California, Berkeley

A Study of Alternative Methods for the Symbolic Calculation of Elliptic Integrals
E. W. Ng, Jet Propulsion Lab., and D. Polajnar, USC

Symbolic/Numeric Algorithms for Partial Differential Equations
D. Ulery and H. Khalil, University of Delaware

Use of Symbolic and Numeric Methods in an Algorithm for the Approximation of Multivariate Functions
D. K. Kahaner and M. Wells, Los Alamos Scientific Lab.

Concluding Remarks
G. E. Collins, University of Wisconsin

Notes